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ROBIN DEBORAH SPRUNG

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ABSTRACT

THE EFFECTS OF IMPLEMENTING A NON-SMOKING POLICY ON AN INPATIENT PSYCHIATRIC SERVICE

Robin Sprung, Yale University School of Medicine, 1990

Increasingly, American medical centers are becoming smoke-free environments. Psychiatric wards, however, are generally exempted from abiding by nonsmoking policies. On April 1, 1989, Yale-New Haven Hospital adopted a smoke-free policy which included one adolescent and two adult inpatient psychiatric units. To determine the effects of the change in this policy, the attitudes of staff members, the use of p.r.n. medications and restraints, the environmental tobacco smoke (ETS) levels, and the urinary nicotine and cotinine levels of patients were measured. The findings indicated that the staff anticipated more difficulties in patient management than actually occurred. Support for the smoke-free policy among the staff members increased from 65.5% to 94% following the ban. An expressed preference to return to a smoking policy was limited to staff who currently smoke ($p<0.004$). No overall difference was found in the total number of p.r.n. medications administered or restraints applied indicating that the patients tolerated the change well. ETS levels were calculated as the average suspended particle mass measured over a 24 hour period. Levels on each of the three wards decreased from 32.90 ug/m^3, 172.62 ug/m^3, and 91.51 ug/m^3 to 1.47 ug/m^3, 2.52 ug/m^3, and 2.76 ug/m^3, respectively, after the ban. The ETS levels were highest on the adolescent unit before the ban. Urinary nicotine and cotinine levels of patients were used to measure tobacco smoke exposure. Among smokers these levels dropped significantly ($p<0.01$). Evidence of ETS exposure was demonstrated in 24 of 24 nonsmoking patients prior to the ban. Four of 7 nonsmokers who submitted urine specimens after the ban showed no evidence of ETS exposure. Adolescent patients reported a decrease in peer pressure to smoke. This study validates the work of other investigators; psychiatric patients can be treated successfully and safely in a smoke-free environment.

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For My Grandmother
SYLVIA SPRUNG KATZ

who made it possible for me to become a physician

and

For My Fiance
BRAD RATCLIFF

who has added immeasurable joy to my life

TABLE OF CONTENTS

LIST OF TABLES AND FIGURES

TABLES

FIGURES

Introduction

An increasing awareness of the dangers of passive as well as active cigarette smoking has heralded significant changes in the policies which govern smoking behaviors. Slowly but surely, hospitals have begun reflecting concern for the welfare of their patients, employees and visitors by banning or restricting cigarette smoking.

Psychiatric services are frequently excluded from abiding by these policy changes. Psychiatric patients have long been recognized as heavy smokers, yet there is resistance to guarding this population from the deleterious consequences of tobacco consumption. One rationale for this is a myth which has evolved since the turn of the century that psychiatric patients are immune to the hazards of smoking and, indeed, may benefit from smoking. Another is the assertion that psychiatric patients cannot stop smoking without intolerable adverse effects. These conceptions have contributed to the resistance to safeguarding the living and treatment environment of the vast majority of psychiatric patients. Recently, several bold hospital administrators have challenged the well-established edict that the mentally ill must smoke and have eliminated smoking from the therapeutic milieu of the psychiatric patient.

This paper begins by examining the increasingly widespread intolerance of smoking in American society and the maneuvers introduced by American medical centers to combat

the smoking problem. The magnitude of the cigarette smoking epidemic in the general and psychiatric patient populations is described, and some of the reasons which have been offered explaining why psychiatric units continue to permit smoking in "smoke-free" hospitals are outlined. The unique dangers of tobacco abuse in this population are also discussed.

Several studies have appeared in the literature in the past two years which suggest that psychiatric patients can stop smoking during a hospitalization without adverse effects. In addition to providing further evidence in support of a non-smoking policy for psychiatric inpatients, this study adds measures of environmental tobacco smoke and nicotine exposure and addresses the special concerns of an adolescent psychiatric patient population.

CONTEXT

General Smoking Policies & Statistics on Smoking

In recent years, there has been widespread public, governmental, and industrial re-evaluation of the use of tobacco products and attitudes toward cigarette smoking. The negative health consequences associated with cigarette smoking and exposure to second-hand smoke have now been well-established (34, 36, 58, 59, 60, 61, 62, 63).

The Department of Health and Human Services has published a series of reports compiled by the Office of the Surgeon General of the United States which document the multiple dangers of smoking, and these have been widely circulated in the media (58, 59, 60, 61, 62, 63). Former Surgeon General C. Everett Koop lead the nation's anti-smoking campaign and wrote extensively about the risks associated with cigarette smoking. "Smoking is the largest single cause of premature death and disability in our society (63)." ". . . cigarette smokers experience higher mortality from coronary artery disease than non-smokers. This extra mortality is persistent at all ages, is experienced by both men and women, and occurs in every country where coronary heart disease is a significant cause of death (60)." Cigarette smoking has also been inextricably linked to an increased risk of lung cancer and chronic obstructive pulmonary disease (59, 61). Dr. Koop's Silver Anniversary Report (1989) outlined the progress made since 1964 when the first Surgeon General's report on smoking

was published. He reports that total and per capita sales of cigarettes have dropped in the United States. Smoking has become less socially acceptable in most groups, and, generally, there are more public restrictions on smoking (35).

By 1986, 30 million Americans quit smoking cigarettes, but 50 million Americans continue smoking today (30, 35). It is estimated that there are 1000 smoking related deaths per day in the United States (35). In 1985, consumers spent $30,700,000,000 on tobacco products. Cigarettes and other tobacco products were the most highly advertised consumer product in the early eighties with $2,000,000,000 spent annually on advertising. Cigarette advertising is directed primarily toward the young, portraying smoking as a carefree group activity symbolizing independence and freedom. Indeed, the preponderance of new smokers in our society seem to be young females and members of minority groups (30). Recently, the R. J. Reynolds Nabisco Co., after considerable pressure from the media, elected to abort an advertising campaign for a new cigarette called "Uptown" which had been targeted for Black consumers.

Public education programs have been effective in convincing adults to give up cigarettes, but for many teens smoking continues to be in vogue (1). Many adolescents find it difficult to resist engaging in high risk behavior, and despite federal regulations against it, the sale of cigarettes to minors continues (20). The statistics are alarming. Of

the 23 million Americans between the ages of 12 and 17, approximately 3.5 million smoke cigarettes. It is estimated that 20% of adolescent girls and 16% of adolescent boys smoke every day. Pierce reports that one million people became smokers in the early 80's, approximately 3000 new smokers each day. Of young females with only a high school education in this sample, the prevalence of cigarette smoking increased from 39% in 1974 to 44% in 1985. For boys, the prevalence decreased from 52% in 1974 to 46% in 1985 (47).

National Health Interview Surveys from 1974 to 1985 were recently reviewed and used to project smoking trends to the year 2000. The prevalence of cigarette smoking in the U.S. has declined linearly since 1974 and, if this trend continues, 22% of American adults will smoke in 2000. This group will be divided by differences in educational level: 10% will be college graduates, 30% will be high school graduates and 60% will not have finished high school. Twenty-three percent of females will be smokers while 20% of males will be smokers. It is projected that 25% of blacks and 21% of whites will smoke.

Efforts to curb the use of tobacco products in this country are mounting. Strategies of federal, state, and local governments, medicine, dentistry, big business, labor, and educators are directed at reducing public consumption of tobacco. These strategies include increasing cigarette excise taxes, banning tobacco advertising, adding warning labels to

tobacco products, legal challenges of cigarette manufacturers' liability for the negative health consequences of tobacco use, protecting non-smokers from the dangers of passive smoking, and generally deeming smoking socially unacceptable (30). Even the voters of Greensboro, North Carolina, in the heart of the tobacco industry recently supported legislation to ban smoking in public areas (1).

In November, 1989, Senator Edward Kennedy introduced stringent new anti-smoking legislation and defined tobacco as "public enemy No. 1 in America today." His proposed legislation calls for $90,000,000 to develop a new division of the Centers for Disease Control specifically to regulate tobacco products. The new center would coordinate tobacco research and education efforts and oversee the industry's use of additives and labeling. Perhaps most important would be support of state education programs to prevent smoking by minors and to curb the sale of tobacco products to minors (1).

The workplace has become the focus of considerable negotiation for the rights of both smokers and nonsmokers. The introduction of smoking restrictions in a variety of settings has raised important questions about the legality of restrictive smoking policies. Ruth A. Behrens writing for the Washington Business Group on Health reported on the current status of legal opinions of smoking restrictions in the workplace. She found that: 1) employees have a right to a smokeless environment; 2) employers have some responsibility

for smoke-related diseases; 3) employers are within their rights to ban smoking or to hire non-smokers (30).

It seems, perhaps surprisingly, that there is widespread support for some form of restriction on smoking at work even among cigarette smokers. Of 1540 men and women over 18 years of age polled by Gallup for the American Lung Association in 1985, 80% of current smokers, 90% of former smokers, and 92% of non-smokers favored designated smoking areas or bans on smoking at work. A nationwide survey of corporate vice presidents and personnel directors indicated that nonsmokers and those willing to refrain from smoking while at work have a better chance of being hired in today's job market (30).

In American schools, smoking policies are becoming more restrictive. American schools are charged with the formidable task of combating the alarming increase in adolescent smoking. Two thousand of this nation's 15,000 public school districts were sampled, of which 66% responded to a survey of school smoking policies and programs on smoking and health. In 1988, 95% of these districts had written smoking policies and 17% had a total ban for both students and adults. Eighty-seven percent reported good to excellent compliance, and this was improved with a total ban on smoking rather than smoking restrictions (54). Tobacco prevention education is more effective when health education programs, adult role models and school policies offer a consistent message that tobacco use is unhealthy and unacceptable (21).

Insurance company policies also reflect the trend toward intolerance of smoking. Two hundred life insurance companies provide discounts for nonsmokers of normal weight and blood pressure. Twenty-nine health insurers also offer discounts for non-smokers. In the Pennsylvania offices of Blue Cross/Blue Shield, the nation's largest health insurance policy carrier, 4000 employees have abided by a smoke-free policy in the largest smokeless office complex in the state. Of the 81,000 people employed by the Blue Cross-Blue Shield corporation nationwide, 42% work in smokeless or significantly smoking-restricted conditions (40).

In 1987, the Bureau of National Affairs surveyed 623 large corporations regarding their smoking policies. Fifty-four percent of the respondents had adopted restrictive smoking policies which represented an increase from 36% in 1986. Northwest Airlines drew considerable publicity when, in 1988, it banned smoking on all flights. The Federal Aviation Administration is expected to review the effects of a 2-year trial ban on smoking on domestic air flights of 2 hours or less in April, 1990 and make recommendations for the future of smoking restrictions in the air. There appears to be substantial support for the current non-smoking policy, even among those air travellers who smoke. A survey of 614 air passengers in California showed 85% in support of smoke-free flights, and 25% of those passenger were smokers.

Ninety-four percent of the flight crew members surveyed supported nonsmoking; 13% of them were smokers (40).

The interests of the tobacco industry remain a powerful force in opposition to this trend. For example, in April, 1988, the R.J. Reynolds Nabisco Co., Inc. withdrew $80 million in advertising from the advertising agency which supported Northwest Airlines in their move to ban smoking on all their flights (35).

Smoking policies even seem to be changing in some of the nation's most restrictive environments. Many inmates now live in smoke-free facilities. The Davis County Jail in Utah is smoke-free, as is the Orchard Cove Jail in the state of Washington. The National Commission on Correctional Care studied the results of a ban on smoking at the Washington Jail and found minimal complaints (40).

Hospital Smoking Policies

The national movement toward restriction of tobacco use has begun to be reflected in the policies of American hospitals. General hospitals have begun adopting a more active role in health promotion by eliminating cigarette sales on hospital premises, restricting or eliminating smoking on hospital property, and offering smoking cessation programs for employees. The American Medical Association has joined the British Medical Association and the Canadian Medical Association in taking a more active role in supporting anti-

smoking legislation (30). Physicians have quit smoking in substantial numbers and many have begun to take more seriously their role in encouraging their patients to quit smoking.

Private corporations still seem to be moving more aggressively toward restrictions on smoking than health care organizations. By spring, 1988, 90% of American hospitals had some written smoking policy, yet only 8% had banned smoking entirely. George Washington University Hospital, for example, became the first in the District of Columbia to become smokeless in 1988 (33). In 1989, fewer than 100 hospitals in the U.S. were smoke-free, even though most with nonsmoking policies claim success (57). The specific rationale for developing the new policies is not necessarily clear or consistent. The American College of Healthcare Executives contacted 744 hospitals, of which 420 responded to a questionnaire about their motivation for developing smoking policies in their hospitals. The most frequently offered justification was an obligation to set an example of good health strategies for the community (33).

Hospital administrators, it seems, may not be so quick to jump on the nonsmoking bandwagon. The needs of patients, visitors, and employees must be carefully considered before any change in policy is introduced. Medical institutions endeavor to provide an environment conducive to health. Hospitals, however, are often very stressful places, and

smokers generally find smoking a stress-reducing activity (33).

Children's hospitals are subject to the same or greater pressures to create smoke-free environments. One large urban children's hospital recently surveyed 762 employees to determine their readiness for a smoking ban. Those who had never smoked as well as former smokers were strongly in support of a smoke-free children's hospital, but only 43%, independent of age, sex or occupation, of the current smokers agreed. In a smoke-free facility, employees are expected to abstain from cigarettes, and many of the smokers stated that they did not wish to serve as nonsmoking role models for others. The authors concluded that helping smokers to quit could enhance the effectiveness of a non-smoking policy (3).

Some states have been more progressive than others in moving toward smoke-free hospital policies (66). In Minnesota, the law requires that all hospitals become smoke-free by 1990, and by 1988, 26% had already banned smoking. St. Cloud Hospital in Minnesota reported their experience instituting a no smoking policy. Although threats were made that employees would quit their jobs, no resignations were submitted. No patients specifically stated they would go elsewhere for care because of the policy. The change was felt to be highly successful by administrators, staff, and patients. The decision was made before the policy was implemented, however, that exceptions should be made for

chemical dependence units and psychiatric services. The report does not include a rationale for having excluded these areas (33).

The feeling that it remains advisable for patients being treated for psychiatric illness or chemical dependence to smoke is widespread (33). Historically, inpatient psychiatric wards have condoned, even encouraged smoking (56).

The National Institutes of Health became the first agency in the Public Health Service to ban smoking in September, 1987. In May, 1988 the only area in which smoking was still permitted was in the clinical center for the treatment of patients with drug addictions. John T. Kalberer, M.D., deputy director of the Division of Disease Prevention at the National Institutes of Health explains, "We felt we couldn't ask a patient to try and break two habits at the same time (40)."

The Mayo Medical Center which had restricted smoking for many years implemented a smoke-free policy in 1987. Hospital administrators believed that "to continue to permit smoking in Mayo facilities would be inconsistent with our leadership role in the health field." The new ban on smoking affected 15,000 employees, 17% of whom were smokers. The smooth transition to a smoke-free environment was somewhat clouded by a dramatic increase in smoking on the fringes of the medical center. Interestingly, only a very small number of employees attended the smoking cessation programs available. At Mayo as well, the inpatient psychiatric services and the

chemical dependence units were excluded from the new non-smoking policy. The overwhelming success of the program in the remainder of the facility, however, prompted the administration to later incorporate the adolescent psychiatric units and the adolescent chemical dependence unit into the new policy (28).

The trend toward increasing smoking restrictions in health care facilities is not only an American phenomenon. In Britain, there is a move afoot to reduce cigarette consumption in hospitals. The feeling that psychiatric patients should continue to be permitted to smoke despite this trend is also not a purely American phenomenon. The lowest levels of restriction on cigarette smoking are imposed in British psychiatric hospitals. In 82% of these facilities, less than 60% of waiting area floor space is designated for non-smokers. A greater percentage of psychiatric hospitals also sell cigarettes, 44%, compared with 27% of acute care facilities, 22% of maternity hospitals, and 29% of general hospitals (7).

The Statistics on Smoking Among Psychiatric Patients

Psychiatric patients smoke cigarettes at rates which far exceed those of the general population. This has been well-established in studies of both psychiatric outpatients and inpatients (27, 39, 41, 45, 50, 56). In 1986, Hughes, studied the prevalence of smoking among 277 psychiatric outpatients

and compared those findings with 1400 subjects in Minnesota and 17,000 subjects in a national sample. At this general psychiatric clinic, 52% of psychiatric outpatients were found to be cigarette smokers, compared with 30% for state residents and 33% in the national sample. Examination of subgroups segregated by diagnosis revealed the highest prevalence of cigarette smoking among schizophrenics, 88%, and a prevalence of 70% among manic-depressives. Sixty-one percent of patients who had previously been hospitalized were cigarette smokers, while only 41% of those who had not been hospitalized smoked. An increased prevalence of smoking in the general population has been associated with being unmarried, with alcohol abuse, and with low socioeconomic status. Although these factors are more likely to be present in a psychiatric population, an increased prevalence of cigarette use was not associated with age, sex, marital status, alcohol use or socioeconomic status in this sample. The prevalence of cigarette smoking among psychiatric patients was 1.6 times that of controls, and this was felt by the author to be an underestimate of true prevalence of cigarette smoking in the psychiatric population (27).

Munetz (1987) studied a psychiatric clinic in which 72% of the schizophrenic outpatients were smokers (41). Chiles (1989) has cited one study in which 85% of schizophrenic, 70% of bipolar patients and 50% of general psychiatric patients were habitual smokers (56). Resnick (1989) found that 71%

of the population of their crisis unit in Oregon were smokers (50). Mauiro (1989) reported a prevalence of 80-84% smokers in a Community Mental Health Center population at the University of Washington (39).

Interested in the prevalence of other addictions in addition to tobacco use, O'Farrell looked at four addictive behaviors in 309 patients hospitalized at a Veteran's Administration Medical Center in Massachusetts: alcohol abuse, drug abuse, obesity, and cigarette smoking. This group found that nearly 90% of all patients had at least one addiction, and 82.9% were smokers. They reported that 88% of schizophrenics, 60% of patients with organic brain syndrome, 85% of patients with affective disorders, 80% of alcoholics, 63% of psychotics, and 67% of patients with personality disorders were smokers. It is notable that Veteran's Administration patients also have discounted cigarettes available to them. In 1983, when this data was obtained, 37% of adult males in the U.S. were smokers; the prevalence of cigarette smoking among psychiatric patients in the Veteran's Administration Medical Center was greater than 2 times that of the general population (45).

Smoking and the Psychiatric Staff

American physicians have stopped smoking cigarettes in substantial numbers, although it is not known if psychiatrists have quit smoking in as high a proportion as physicians in

other subspecialties. Many physicians have begun to recommend smoking cessation programs to their patients, and this has been found to have significant impact (27, 35). Although psychiatrists recognize nicotine abuse as an addiction warranting its own diagnostic category in the DSM III and DSM IIIR, they have not adopted a broad anti-smoking position with their patients. Although many no longer permit smoking during therapy sessions, some psychiatrists continue to insist that smoking benefits patients (18).

Despite the ever growing volume of data which substantiates the fact that cigarette smoking is dangerous to one's health, nurses, particularly psychiatric nurses, demonstrate a higher prevalence of smoking than the general population. Mallot & Hatch reported that 25-39% of nurses smoke and that psychiatric nurses had the second highest prevalence among all nurses (56). This finding has been documented in the United Kingdom as well. A 1975 survey of Scottish nurses revealed that 48% smoked cigarettes regularly compared to 39% of females in the general population (15).

Psychiatric nurses continue to smoke and, if they are non-smokers, to be exposed to excessive smoke at work. It is often the responsibility of the psychiatric staff member to reinforce good behavior with cigarettes and to light patients' cigarettes for them. Exposure to cigarette smoke is part of the job, and patient care continues to be provided in areas filled with lingering smoke (15).

The Myth of Immunity

The risk of cancer in schizophrenics has been studied since the turn of the century, and a myth has evolved that schizophrenics harbor a special immunity to cancer. Although the literature contains numerous studies, the conclusions from these are extremely controversial and must be evaluated carefully. In Britain, the Board of Control (Commissioners in Lunacy, 1909) reported that the insane may have some immunity from cancer. In the 1920's and 30's, the paucity of malignancy among the mentally disturbed, particularly among schizophrenics, was described in a series of studies. These, however, were refuted by other work from the late 1920's through the 1970's (2). Katz (1967) conducted a well-designed, extensive study of mental patients in New York State who had been hospitalized from 1955-1961. The total mortality from cancer was much higher than in the general population. The prevalence of cardiovascular diseases was also increased overall.

Some poorly controlled studies have documented lower rates of lung cancer in schizophrenics than in controls (27). Several hypotheses were proposed to explain this phenomenon: 1) that schizophrenics harbor a metabolic defect which protects them from developing cancer; 2) that phenothiazines have some antitumorogenic properties; 3) that the social isolation which most schizophrenics experience, particularly if they are hospitalized for long periods, is stress-reducing

thereby decreasing the propensity to develop cancer; or, 4) that these people die earlier from unnatural causes. None of these hypotheses have been tested directly. The relationship between the excessive smoking of psychiatric patients and any increased or decreased risk of cardiovascular disease or malignancy has not been adequately documented.

Why Do Psychiatric Patients Smoke?

Nicotine is contained in all tobacco products and is the addicting drug in tobacco. Nicotine crosses the blood brain barrier, and its effects persist with daily use for 24 hours. Nicotine affects nearly all components of endocrine and neuroendocrine function. Tolerance to nicotine develops very rapidly and reinforces its use. The symptoms of nicotine withdrawal may be experienced in as brief a period as twenty minutes after smoking, and this may lead to the behavior called chain-smoking (48, 49). The physiologic effects of nicotine coupled with the psychological effects of the act of smoking seem to provide powerful reinforcement for tobacco abuse. Stress tends to increase cigarette consumption among smokers, and this has been identified as an important risk factor for adolescents (22). It is clear that cigarette smoking is epidemic in the psychiatric patient population, yet the specific reasons for this remain elusive.

Whether or not most psychiatric patients suffer the long term sequela of heavy cigarette smoke ingestion, the belief

that psychiatric patients do enjoy benefits from smoking is widely held. During the 40th Annual Institute on Hospital & Community Psychiatry held in October, 1988, John A. Chiles, M. D. of Seattle conducted a workshop on the significance of cigarette smoking in psychiatric care. He noted that cigarette smoking increases concentration, decreases tension and fights boredom. Many psychiatric professionals hear patients say, "Cigarettes are my only joy." Chiles remarked, "We have no psychotropic drugs available to us as good as nicotine." Nicotine is a stimulant and sedative, pain killer, performance enhancer and anorectic (56). Dependency on cigarettes is physiological, behavioral, and psychological. During psychiatric illness, issues of dependency, vulnerability and loss are often paramount. It is then that the meaning of cigarettes can become "unique, sometimes magical and ritualistic" (55).

Other hypotheses offered to explain the high prevalence of tobacco addiction have been described: 1) that nicotine counteracts the adrenaline deficiency thought to exist in certain psychiatric illnesses (27); 2) that aggression, agitation, and problems with concentration may be mitigated by smoking (41); 3) that psychiatric patients are dependent people and at special risk for drug addiction (18); 4) that it is easier for psychiatric patients to talk with others while smoking (39); and, 5) that patients smoke to self-

medicate, control aggression and counteract the sedative effects of medications (11).

Aneshensel (1986) showed that the prevalence and intensity of cigarette smoking did not vary with the remission or onset of depression, although abstinence from cigarettes did result for some period in increased anxiety, insomnia, increased food intake, restlessness, irritability, headaches, and a decrease in concentration (27).

Hospital administrators and physicians often assume that it is unreasonable to expect psychiatric patients, who appear to be among the most addicted smokers, to be able to cope with a restriction on cigarettes (33, 40, 46). This argument is inconsistent with the reality that psychiatric patients are expected to cooperate with a considerable number of rules and regulations, and generally do so without untoward effects. Drug abusers and alcoholics are expected to abstain from their substance abuse, and may or may not be treated with medication for prophylaxis of withdrawal. Cannabis abusers are expected to tolerate abstinence from their drug during hospitals stays. Aggressive behavior is not tolerated. Medications and treatments are expected to be accepted. In fact, most psychiatric and chemical dependence units are highly structured settings with a plethora of specific rules and regulations which patients are required to abide by. Despite the fact that cigarettes and lighters may be used by psychiatric patients to inflict self-injury and that smoking

is the leading cause of hospital fires and fire-related deaths (52), cigarettes are deemed indispensable.

The psychiatric literature offers many explanations. There is fear that patients will act out aggressively if cigarettes were denied them. Cigarettes are often used as tokens to positively reinforce acceptable behavior; their elimination would rob the staff of the "carrots" given as rewards for good behavior (50).

The argument has been made by staff members that psychiatric patients' civil rights would be violated if smoking was not permitted. Most people are free to come and go from a facility to smoke if they choose, but this is often not an option for the psychiatric patient. Although the same rationale could be proposed for medical patients too ill to leave their hospitals beds, some feel that psychiatric patients are not in the hospital for "medical problems" and, therefore, any focus on potential medical consequences of smoking has no real place in a psychiatric setting.

Some staff feel that nicotine withdrawal could be potentially harmful to psychiatric patients. It is a common concern that, if cigarettes were banned, patients would sneak a smoke in forbidden areas posing a greater threat of fire (15, 17).

There are many professionals who feel strongly that smoking provides social benefits for patients. Smoking is seen by many as a vehicle for communication among disturbed

individuals who exist with few social pleasures and little directed energy (39, 46).

Psychiatric staff also offer a psychodynamic argument against imposing a limitation on smoking. Any restriction imposed on a patient often becomes the focus of attention, rather than the issues which are actually central in their illness. Staff may expect enormous difficulty in assisting a smoker to focus on anything other than a smoking limitation when others serious issues abound (15).

Administrators fear that staff would quit their jobs if they could not smoke at work. Concern has also been expressed that many patients would preferentially choose to admit themselves to hospitals which permitted smoking, and a drop in the patient census could potentially threaten the financial foundation of a facility (17, 50).

Managing a psychiatric unit always requires some "policing". For example, staff members customarily check through patients' belongings, confiscate dangerous objects, drugs or alcohol, and take periodic head counts to be certain no one has eloped. Many psychiatric staff are often concerned, however, that policing a smoke-free ward would be too monumental a task (15, 18).

Gralnick (1988) describes his experience at High Point Hospital in Port Chester, New York on a ward for chronically ill psychiatric patients where he attempted to address the issue of excessive cigarette smoking (18).

"Patients at 'smoking time'...gather about a match

> to light up. They gather like moths to a flame, some actually quivering. They do so with such a desperation that one would think they are drawing on the breath of life rather than that of threatening death (p.87)".

In response, Roger Peele, M.D., the Chief Clinical Officer and Chair of the Department of Psychiatry for the Commission on Mental Health Services of the District of Columbia, himself a nonsmoker, writes, "Sometimes...the patients' only clear and well conceived social initiatives are to obtain cigarettes. On one unit at St. Elizabeth's, for example, sociograms found 80% of the patients' communication with each other were about cigarettes...it seems inconsiderate to bar smoking per se. There are many unhealthy habits that some find a pleasure. For a few permanently, severely mentally handicapped, many of whom cannot advocate their interests fully, barring them from smoking seems like oppression, not treatment (46)."

The rituals of cigarette smoking, particularly when the smokers are psychotic, disorganized patients, are dangerous. In the typical chronic psychiatric ward, smoking and the misuse of smoking materials is the rule, and staff may feel paralyzed to deal effectively with the problem by either eliminating smoking or enforcing rules for safe smoking. Psychiatric nurses and aides dispense cigarettes to patronize negativistic, threatening patients, to reduce agitation, and to curb the risk of assaultiveness. Staff avoid confrontation with patients by not only tolerating, but promoting cigarette

consumption as a form of medication or therapeutic intervention (17).

> "Twenty-five patients chain-smoked in the dayroom and hallways. When their cigarettes were consumed, stolen, taken or given away, they smoked 'snipes' (rubbed out butts) scavenged from the floors, rubbish barrels, or ashtrays. Because the patients generally preferred non-filtered brands, they often burned their lips and noses when lighting short snipes, and smoked them down until pain occurred, or patients showered themselves with sparks as they smoked. Shirts and pants were dotted with burnholes. Occasionally, a patient set himself on fire this way, or by sitting on burning butts and matches, or secretly burning snipes in his pockets (p. 87)."

Because of the myth of immunity, the assertion that smoking is beneficial to psychiatric patients, and the belief that psychiatric patients cannot stop smoking safely, psychiatric units continue to permit smoking.

Psychiatric Patients Are Especially Harmed by Cigarette Smoking

Smoking may play a role in other conditions which plague psychiatric patients (5, 6, 8, 9, 12, 13, 18, 27, 32, 56, 64). There is some indication that the risk of tardive dyskinesia, a disorder characterized by involuntary movement following exposure to neuroleptics, is increased in smokers. In Japan, tardive dyskinesia (TD) was assessed using the AIMS scale in 126 psychiatric patients. Of smokers, 29% had TD and of nonsmokers, 10.5% had TD. None of the other known risk factors for TD: non-schizophrenic psychiatric illness, female

gender, increased age, and longer exposure and higher dose neuroleptics seemed to account for this difference. Smokers may require higher doses of medication, and this is a risk factor for TD; however, in this study patients were on similar doses of medication, suggesting that smoking alone may be a risk factor (5). Tobacco has also been implicated in the development of polydipsia and associated hyponatremia in long-term psychiatric patients (6, 12, 32).

Hydrocarbons contained in tobacco affect drug metabolism by stimulating hepatic microsomal enzyme systems. This decreases a drug's steady state plasma level and duration of action and changes the ratio of beneficial to adverse drug effects (18, 27, 56, 64). Vinarova investigated the relationship between smoking and the dosage of neuroleptic drugs needed to achieve a therapeutic response at the Institute of Psychiatry in Prague. In this study, doses of Chlorpromazine or Chlorpromazine equivalents in nonsmokers was 71.3% of the doses required in smokers to achieve equivalent therapeutic effects. On one unit the dosage of neuroleptics needed by male smokers was greater than double that needed by nonsmokers (64).

Ereshefsky studied 61 psychiatric patients on fluphenazine. Both smokers and nonsmokers were within the same dosage range, had reached steady state plasma levels, were not given p.r.n. medications, and were on no other medications known to be enzyme inducing. Plasma levels were

decreased in smokers, with clearance increased by a factor of .67 for oral fluphenazine HCl and a factor of 2.33 for fluphenazine decanoate (13).

An increase in medication clearance and a concomitant decrease in steady state plasma levels in the presence of cigarette smoke requires an overall increase in drug dosages for therapeutic results, thereby possibly increasing the risk of tardive dyskinesia.

Recent Studies

Several recent studies have shown that psychiatric patients can stop smoking cigarettes without adverse effects. Investigations have been carried out in outpatient settings, in Community Mental Health Centers and in inpatient psychiatric facilities.

Munetz and Davies (1989) recently wrote of their experience in a psychiatric clinic which provides treatment for schizophrenic outpatients (41). Seventy-two percent of the patients were smokers when their facility was temporarily moved to a small, poorly ventilated area with a non-smoking waiting room. For most, smoking while waiting to meet with a therapist was an important daily activity, particularly since smoking was no longer allowed during most sessions. A questionnaire distributed to determine the patients' reactions to the change elicited three themes: 1) smokers have rights too, 2) smoking is unhealthy and a nuisance, and 3) smokers

understand the discomfort of non-smokers. Although required to abstain from smoking while at the clinic, the temporary move was surprisingly well-tolerated by the patients. The authors recommend that psychiatric clinics, like other health care facilities, consider whether or not permitting smoking is appropriate (41).

Maiuro, et al. studied the patient reactions to a no smoking policy in an urban community mental health center in the state of Washington (39). The prevalence of cigarette smoking was determined to be 80-84% among 103 randomly selected patients. Patient attitudes and affective reactions to the implementation of the no smoking policy was assessed using a smoking questionnaire prior to and following the change. Initially, the change was felt to be a negative one by smokers and a positive one by nonsmokers. Smokers felt the ban would "not change" or make their mental health "a little worse." Nonsmokers thought they would "be a little better." Smokers felt their physical health would not change while nonsmokers felt theirs would improve. A follow-up survey of patients showed that 88% were unaware of any significant mental health or social consequences of the nonsmoking regulations. A 16 month follow-up survey of clinicians suggested that the negative reactions of smokers were transitory and not disruptive. Patient smoking on surrounding hospital grounds, however, had dramatically increased even in inclement weather. Overall, clinicians felt there was an

improvement in the service environment and the well-being of nonsmoking patients and staff (39).

David Mallot, M.D. and Barbara Hatch, B.S.N., R.N. discussed their experience with smoking restrictions on a general psychiatric unit in a general hospital affiliated with the University of Maryland Medical System (56). A brief ban on all smoking was implemented first; then, a small smoking room with a powerful ventilation system was installed which was open four times each day. The feared consequences of these new restrictions were not borne out. There was no difference in the numbers of assaults, self-inflicted injuries, suicide attempts or suicide precautions measured before and after the change in smoking policy. The observation of smoking restrictions, according to Mallot, helps prepare patients to face the increase in restrictions outside the hospital which are becoming more common. These investigators feel that psychiatry will become part of the smoking cessation trend whether it wants to or not.

The Providence Medical Center in Seattle, Washington is a 359-bed private, not for profit hospital with a 42-bed psychiatric service. Confident that cigarette smoking could be eliminated from the environment, a ban on smoking was introduced on all services on September 1, 1987. A study was conducted on the three psychiatric wards to measure patient-related problems associated with the ban using the Moos Ward

Atmosphere Scale and to assess the medical and nursing staff perceptions of the ban using a questionnaire (55).

Sixty-seven percent of medical staff members returned the questionnaires. Eighteen percent of the medical staff were smokers and most expected little difficulty as a result of the ban with the exception of possible problems calming agitated patients and an increase in attention-seeking behavior among the patients. The temporary abstinence from cigarettes required during hospitalization was viewed by some psychiatrists as beneficial, by others as detrimental. Seventy-seven percent reported that the policy would not affect who they admitted to the hospital, two reported they would favor this hospital, and one said he would send hard-core smokers elsewhere. One physician was strongly opposed to the ban and voiced his need for privileges to transfer patients elsewhere. One psychiatrist expected the ban to be a focal point of treatment resistance, one felt that new smokers would not be created, and one forcefully said that the policy would put the self-destructive in immediate danger.

Seventy-six percent of the nursing staff returned their questionnaires. The 31 nurses who smoked viewed the smokeless environment as less pleasant than the 72 nonsmokers, but both groups were more strongly in favor of the ban following its implementation. Smokers did continue to perceive more patient management problems after the ban, although all expected much more difficulty than actually occurred. During the study

period, there was one patient self-injury, four discharges A.M.A., 6 episodes of inappropriate attention-seeking and 2 premature discharges believed to be related to the smoking ban. There were no staff injuries, elopements, medication refusals or threats.

In summary, both doctors and nurses expected much worse than what occurred. Medical consultants visiting the wards following the ban offered strong support for the cleaner environment. Patients were expected to refrain from smoking during hospitalization, not necessarily to quit smoking entirely. Patients with off-unit privileges could smoke outside the hospital. Controlling the urge to smoke was viewed as an opportunity to practice impulse control skills. The authors concluded that units which emphasize active staff involvement and patient responsibility are less likely to experience problems implementing a non-smoking policy. It should be noted that this report does not describe the use of any nicotine substitutes, although patients were encouraged to consume the carrot sticks, candy and gum made available by the staff to curb the "oral" needs of patients. Thorward and Birnbaum recently reported the results of another smoking ban on a 17-bed inpatient psychiatric unit in a general hospital begun January 1, 1987 (57). This unit provides treatment for an average of 550 patients annually. Most patients are admitted voluntarily and the admitting diagnoses are: 40%

thought disorders, 40% affective disorders, 10% personality disorders, and 10% other.

The unit was described as typically dense with smoke and polluted with cigarette butts. Sixty percent of the patients were smokers and were permitted to smoke in designated areas except during large group meetings.

Initially, the staff anticipated a variety of problems felt to be unique to psychiatric patients. These included the potential for a drop in patient census due to the ban, an increase in anxiety and agitation, displacement of 'real issues', and difficulty policing the wards. What they found was that the absence of cigarettes had only a minimal impact on the program. Specifically, one patient was discharged due to the policy, and only two patients of the 265 admitted in the first 6 months focused on smoking to the extent that it disrupted treatment. The average number of p.r.n. medications administered for agitated behavior was unchanged after the smoking ban went into effect, and no significant incidents related to the ban were reported.

The unit provided a nicotine substitute, Nicorette gum, to patients to curb their cravings for cigarettes. Patients were also permitted to smoke outside the unit except during planned activities. No formal smoking cessation programs were offered on the unit for staff or patients, and the authors were unaware of any smokers who elected to quit smoking entirely.

A number of papers have described the results of the pioneer work of Michael Resnick, M.D. and his colleagues at the Oregon Health Sciences University Hospital in Portland (11, 50, 52). Their research was conducted on a 12-bed acute care and crisis unit which serves a predominantly medically indigent population. Most of their patients are admitted through the emergency room, 40% committed to the facility involuntarily for treatment. The majority are psychotic when admitted and may be suicidal with confounding drug and alcohol problems. Very few of these patients have off-ward privileges during their evaluation and stabilization, although most have passes before discharge. Seventy-one percent of the patients were smokers and smoked in the day room from 8 AM until 11 PM. Nursing staff dispensed and lit cigarettes and supervised smoking.

After much deliberation and an extensive survey of Oregon's 48 psychiatric facilities (50), all of which permitted smoking, the staff agreed to implement a ban on smoking on November 23, 1986. Chart reviews were conducted before and after the ban to review medication doses and the need for p.r.n.'s, restraints, seclusion, and security calls. No change was found in any of these parameters except in the administration of Nicorette gum which increased dramatically from 7 p.r.n. doses to 176 p.r.n. doses.

Questionnaires were also distributed to patients and staff to determine their reactions to the ban. Among the

patients, only 7% favored a smoking ban before its implementation while 22% did following the ban. Among the staff there was an even more dramatic shift in opinion. Before the unit became smoke-free, 24% of the staff favored the change; afterwards, 95% were in favor of the ban with 17% declaring the new policy successful and 83% declaring it very successful.

The leadership of the unit felt that banning smoking was analogous to controlling alcohol and caffeine consumption with nicotine withdrawal managed with Nicorette gum. The quality of the environment was felt to be improved, with visiting students and consultants viewing it as a healthier place. Inspired by the successful transition to a smoke-free facility, two private and one state psychiatric hospital in the area were reported to have adopted such a policy.

The authors raise several important points. First, young psychiatric patients, in particular, need not be treated in a smoke-filled environment where cigarettes are used as rewards for good behavior when adequate care can be provided in a smokeless environment. Second, it has been well-documented that serum levels of psychotropic drugs drop when a patient smokes. If a patient is stabilized in a non-smoking facility and resumes smoking after discharge, special attention must be paid to the potential need to adjust drug dosages following discharge.

A Nonsmoking Policy at Yale-New Haven Hospital

The mandate of the administration of Yale-New Haven Hospital to eliminate smoking throughout the institution provided an excellent opportunity to obtain additional data about non-smoking policies for psychiatric facilities. This study was designed to retest the hypotheses of other descriptive studies which focused on changes in staff and patient attitudes toward smoking policies and on changes in patient behaviors before and after the adoption of a smoke-free policy. In addition, this study included biologic measures of environmental tobacco smoke exposure using urinary nicotine and cotinine assays before and after the smoking ban and obtained measures of the quantitative changes in air quality and levels of environmental pollutants using air monitors before and after the smoking ban. To date, there have been no studies reported which address the special issues related to adopting a smoke-free policy on an adolescent psychiatric unit. This study was conducted on an adolescent unit as well as on two adult units and does address some of the special considerations for adolescent patients. Finally, implications for changes in staffing patterns and hospital architectural design which non-smoking policies may call for are addressed.

DESCRIPTION OF THE SETTING

Yale-New Haven Hospital is an 875-bed general hospital in New Haven, Connecticut. Three private inpatient psychiatric units, one 9-bed adult, one 15-bed adult and one 17-bed adolescent unit, are housed in the general hospital. Four hundred twenty patients were served by the psychiatric inpatient service in 1988.

Psychiatric patients are referred from outpatient settings, from psychiatrists, psychologists, psychiatric social workers and other therapists, through the emergency room, and by self-referral.

Patients are admitted for evaluation and treatment and represent a wide array of psychiatric illness, including schizophrenia, affective disorders, eating disorders, conduct disorders, and personality disorders. None of the services caters specifically to drug or alcohol dependence. The great majority of patients are admitted under voluntary status, although patients are occasionally committed for involuntary treatment. The youngest patients admitted to the adolescent service are approximately 12 years old and the oldest may be in their twenties. The adult services treat some older adolescents and adults of all ages.

The three chiefs of service are senior attending psychiatrists. One psychologist, four neuropsychologists, six social workers, and 41 psychiatric nurses and mental health workers comprise the remainder of the permanent

clinical staff. Eight psychiatry residents are assigned to the units on a rotating basis for education and training. Five staff members provide clerical services most days and evenings.

DESCRIPTION OF THE METHODS

On April 1, 1989, Yale-New Haven Hospital adopted a non-smoking policy. This project was undertaken in anticipation of the new non-smoking policy to examine several parameters which could be expected to change in response. Changes in policy were initiated, designed, developed and carried out by the hospital administration and clinicians.

Monitoring Environmental Tobacco Smoke

The adverse health and comfort effects associated with involuntary smoking are of paramount concern for those living and working in a densely smoke-filled environment. Environmental tobacco smoke (ETS), a major source of indoor environmental contamination, is composed of greater than 4,000 chemicals in the vapor and particulate phase. ETS is made up of exhaled mainstream smoke, sidestream smoke emitted from smoldering tobacco, and contaminants which diffuse through cigarette paper. Mainstream smoke exists primarily in the particulate phase, while sidestream smoke is diluted rapidly in air and provides the major source of unprotonated nicotine in the vapor phase. Nicotine, itself, is not considered the

agent of the adverse effects associated with smoking. ETS contains numerous carcinogenic substances and irritants. Exposure to high levels of these agents is related to acute irritation of the conjunctiva of the eyes and the mucous membranes of the nose, throat, and bronchial tree and chronic risks of lung diseases including cancer and emphysema (4, 36, 58).

To assess the level of exposure to ETS and to conduct epidemiologic studies of the associated risks, a marker or proxy had to be selected which would be unique to tobacco, easily detectable at low concentrations, found in a consistent ratio to other ETS contaminants of interest, similar in a variety of tobacco products, and easily measurable. Particle and vapor phase nicotine, carbon monoxide, tobacco specific nitrosamines, 3-ethenylpyridine, nitrogen dioxide, acrolein, benzene, toluene, solanesol, polonium-210, the very general category of respirable suspended particle mass, and a number of other compounds have been evaluated for use as markers for ETS. A number of factors which influence the concentration of airborne contaminants in a given indoor environment and which, ideally, would be considered in assessing ETS include: 1) nature and rate of contaminant production; 2) number of sources of contaminants; 3) nature and rate of chemical transformation of contaminants; 4) ventilation rates and air contaminant removal systems; 5) building characteristics;

6) outdoor concentrations of contaminants; and, 7) meteorologic conditions.

Vapor phase nicotine has been evaluated as a marker for ETS (23, 24, 42) and has been assessed recently in a combined environmental chamber and field study (37, 38). Passive nicotine monitors developed at the Pierce Foundation Laboratories were employed in these studies and proved to be an accurate, convenient and inexpensive method of assessing levels of exposure to environmental nicotine concentrations. Vapor phase nicotine measurements obtained using the monitors were closely related to the numbers of cigarettes smoked and were predictive of the respirable suspended particle mass generated by the burning of tobacco. A ratio of 12 to 1 for particle mass to vapor phase nicotine has been demonstrated for ETS (38). Although there have been no health guidelines or standards established to date for environmental nicotine exposure, the U.S. Environmental Protection Agency has established an outdoor health standard for suspended particles less than 10 micrometers in diameter. A yearly average of 50 ug/m^3 or a 24 hour value of 150 ug/m^3 is not to be exceeded more than once a year (14). All of the respirable suspended particles found in ETS are less than 10 micrometers in diameter.

Passive nicotine monitors were selected to assess the level of exposure to ETS (Figure 1, p.43). Eight monitors were placed in strategic locations on each of the units for

a seven day period 2 weeks prior to and a seven day period 2 weeks following the policy change (Figures 2a, 2b, 2c: Architect's Floor Plans of Units I, II, & III, including Monitor Placement, pp. 44-46). The day rooms and dining areas were selected for monitoring because these are the regular gathering areas for patients which were frequently used for smoking. The sitting area directly opposite the nurse's station on Unit I had been used frequently for supervised smoking. The patient rooms, bathrooms and showers were already nonsmoking areas.

Monitoring Nicotine Exposure

Nicotine and cotinine, a metabolite of nicotine, are easily measured in blood, urine or saliva and have been widely used as biomarkers of both active smoking and exposure to environmental tobacco smoke (26, 31, 58).

Nicotine is highly specific to tobacco exposure. Nicotine is absorbed through mucous membranes in the oral cavity and respiratory tract and across alveolar membranes. Nicotine is distributed rapidly and widely and is metabolized by the liver. Some 2 to 25% of unmetabolized nicotine excretion is handled by the kidney and varies with urinary flow. The rate of nicotine metabolism varies as much as fourfold among different individuals. A single dose results in a rapidly decreasing serum concentration with an elimination half-life of only 5 to 10 minutes. Following

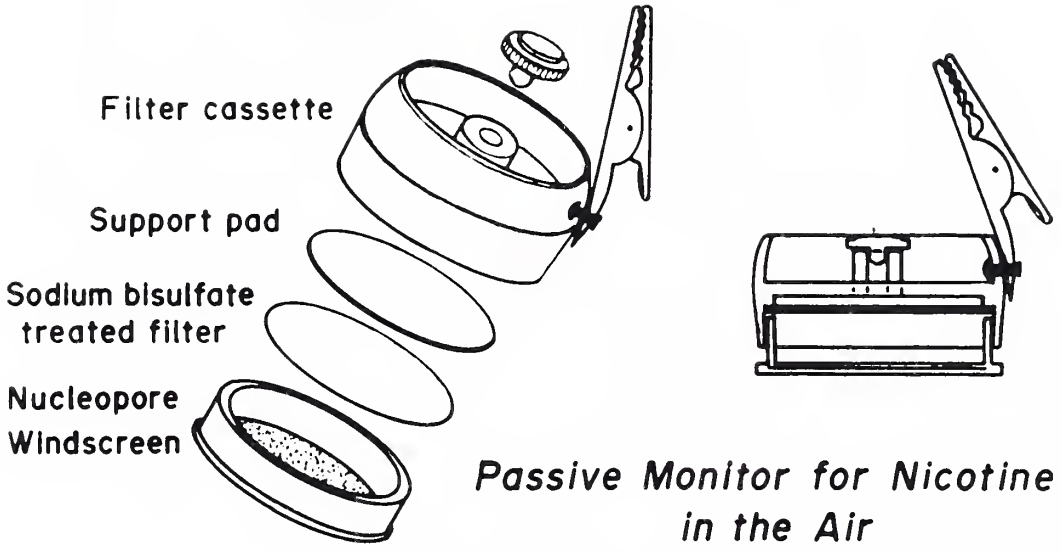

Figure 1. Diagram of passive monitor to sample nicotine in the air.

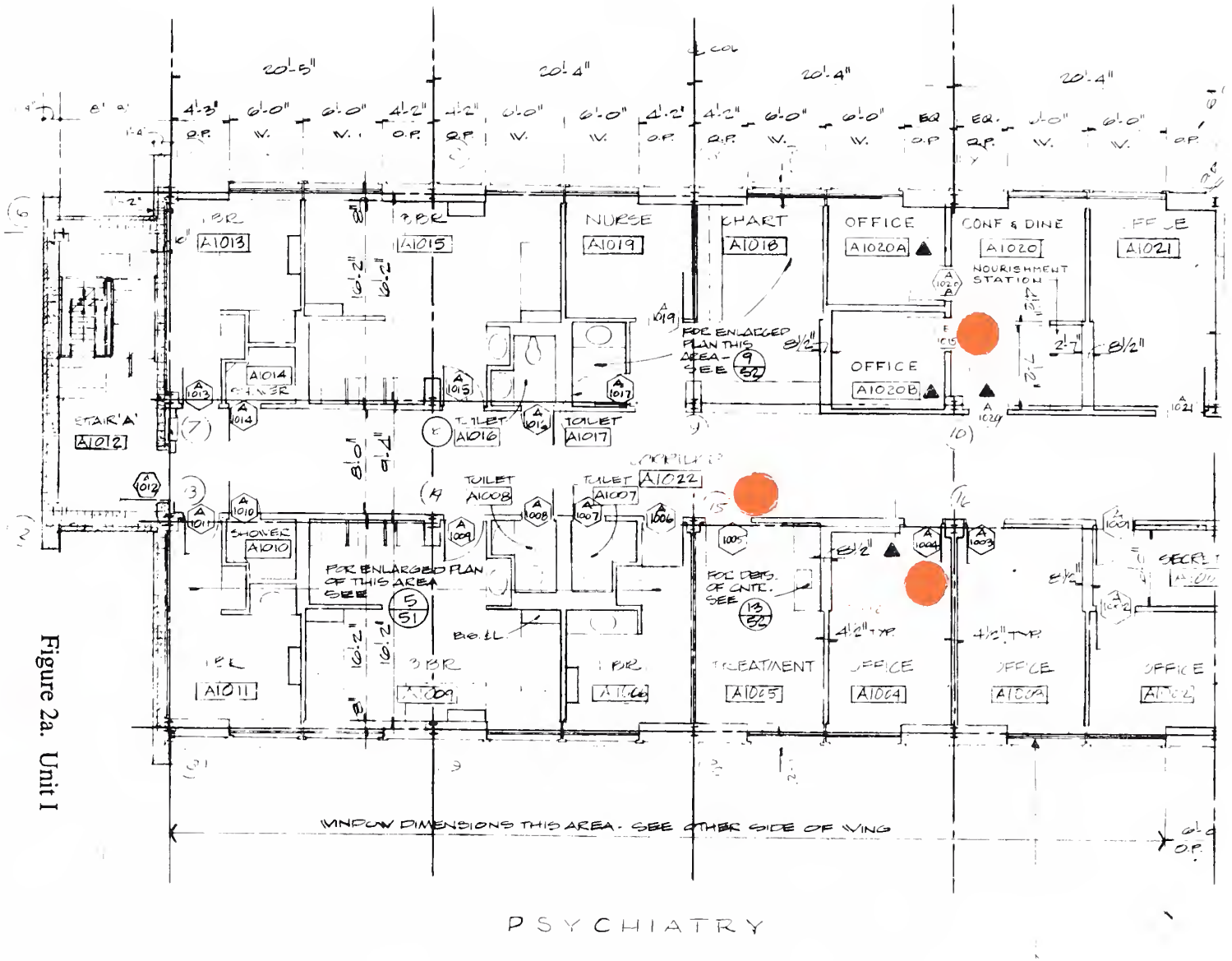

Figure 2a. Unit I

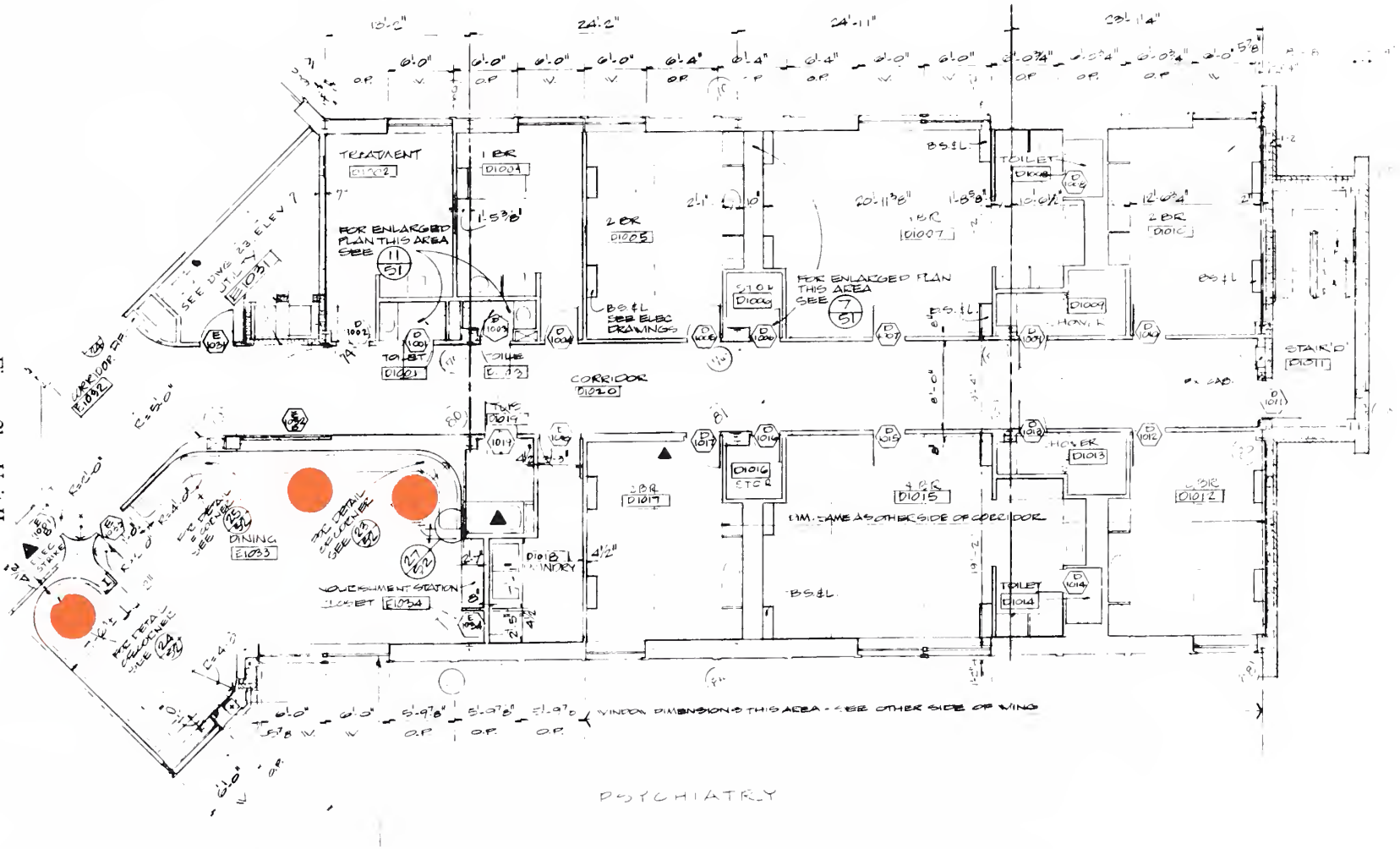

Figure 2b. Unit II

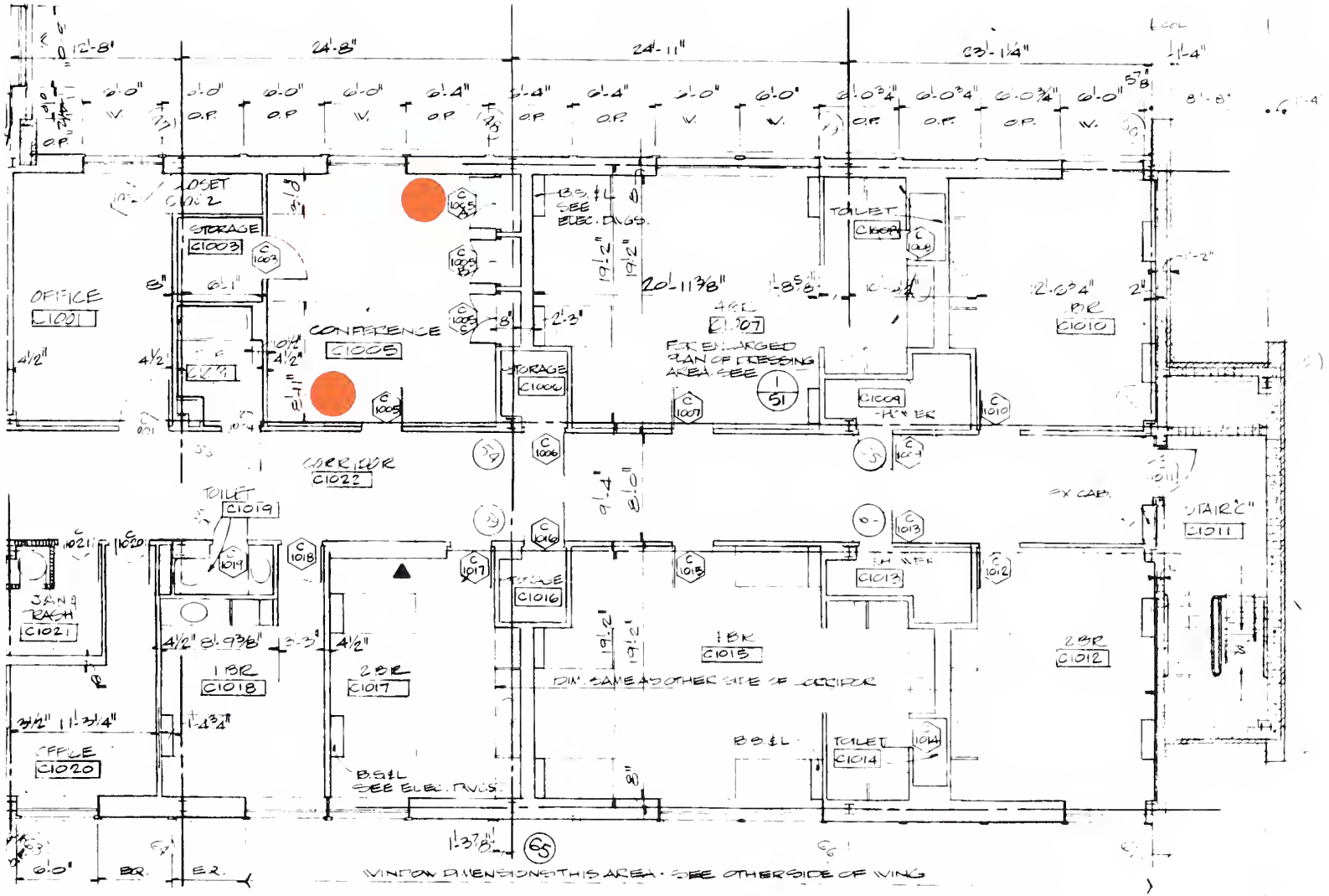

Figure 2c. Unit III

multiple doses, body tissues become saturated and elimination half-life rises to as long as 2 hours. Thus, the measurement of nicotine concentration in body fluids is specific and sensitive for recent tobacco exposure. Urinary nicotine levels are highly variable and are therefore expressed as a ratio of urinary nicotine to urinary creatinine which is excreted at a relatively constant rate throughout the day (31, 65).

Cotinine is the major metabolite of nicotine and is eliminated primarily by metabolism. Fifteen to 20% is eliminated unchanged by the kidney. The elimination half-life of cotinine ranges from 10 to 37 hours with an average of 20 hours. Cotinine is highly specific for tobacco exposure and, because of its long half-life, is accepted as the best marker for both active and passive smoking (31, 58).

Nicotine and cotinine were selected in this study to serve as markers of exposure to tobacco smoke. It is important to note that although these biomarkers do provide evidence that exposure has taken place and are indicative of dose, they may not be directly related to the potential for development of the adverse health effects which result from smoking (58).

After obtaining verbal consent and a personal smoking history, urine samples were collected by the nursing staff from patients able to cooperate with first morning urine collections. This sample collection was somewhat hampered by

the presence of shared toilet facilities and rather hectic morning routines. Collecting as many samples as possible on quiet weekend mornings proved helpful.

Two weeks prior to the policy change, samples were collected from both smokers and nonsmokers to reflect the ingestion of smoke from both active and passive routes. Two weeks after the ban on smoking, urine samples were again collected in the same manner. Due to the relatively brisk turnover of patients in a one month period, only 7 patients able to cooperate with the study were hospitalized during both urine collections.

Monitoring Patient Acuity

If the absence of cigarettes in the environment was to generate significant disruption, agitation or anxiety, this would be expected to be reflected in the use of p.r.n. medications and the use of restraints (there are no seclusion rooms on these three units). These variables were measured for all patients for a period of 6 weeks before and 6 weeks following the smoking ban. Each patient's medication administration record was reviewed and all medications administered p.r.n. for anxiety, agitation, insomnia, analgesia, and dyspepsia were recorded. This included antipsychotics, anxiolytics, sedative-hypnotics, analgesics, and antacids. Data on the administration of analgesics and antacids was included to determine whether or not patients

were experiencing any physical discomfort possibly associated with tobacco withdrawal, i.e. headaches, heartburn, etc. In addition, p.r.n. doses of Nicorette gum, introduced as a nicotine substitute and administered on request by the patients, were recorded. Ninety-three charts were reviewed for physician's orders to apply restraints.

Staff Questionnaires

Questionnaires were distributed to all staff members to collect demographic information and included the individual's own smoking history and attitudes toward smoking and hospital smoking policies. The first questionnaire was completed one month before and a follow-up questionnaire was completed one month following the change in policy (Appendix A and B).

Data Analysis

Data were analyzed in several ways, both manually and with use of the Statistical Analysis System (SAS) on the VAX computer at the Biomedical Computing Unit at the Yale University School of Medicine. Student's t-tests and Chi-Square Analysis were used for continuous and noncontinuous variables, respectively, except where otherwise indicated. A probability level of $p<0.05$ was obtained for each result reported as significant.

RESULTS

Monitoring Environmental Tobacco Smoke

Nicotine monitors placed in 8 strategic locations on the three units were exposed to the indoor air for 7 days or 168 consecutive hours. The monitors were sent to S. K. Hammond, Ph.D. for analysis by gas chromatography and the concentrations of nicotine in the sodium bisulfate treated filters were reported in micrograms. To determine the sampling rate, the following calculation was used (23, 24):

$$\text{Sampling rate} = \frac{\text{mass collected}}{\text{concentration x time}} = \frac{D\ A}{L}$$

Where D is the diffusion coefficient and equals 0.060 cm^2/s[10], A is the cross-sectional area of the sampler and equals 8.11 cm^2, and L is the distance between the windscreen and the treated filter and equals 1.17 cm. The sampling rate was calculated to be 25 mL/minute. The empirical rate determined experimentally was 24 mL/minute (23). To determine the average concentration of vapor nicotine per unit volume, the following calculation was used:

$$ug/m^3 \text{ nicotine} = \frac{\text{ug nicotine/ 24 mL/min/ 60 min/hr/ 168 hr.}}{10^6}$$

The concentration of respirable suspended particle mass is expected to be 12 times the concentration of vapor phase nicotine in ETS. It should be noted that additional sources

of particle mass typically contribute background levels of 20 ug/m^3.

Table 1 (p. 52) contains the nicotine monitor recordings both before and after the smoking ban for all three units. The highest values for nicotine concentration in the environment before the ban were obtained on Unit II, the adolescent unit. Environmental nicotine exposure and suspended particulate mass on Units I & III were compared with Unit II and were found to be significantly higher on Unit II ($p<0.003$). The large Unit II dayroom (Figure 2b, p. 45), which also functions as a kitchen, dining room and meeting room, had recorded nicotine levels which reflected a mean suspended particle mass concentration of 172.92 ug/m3 averaged over a 24 hour period. This value exceeds the maximum E.P.A. recommended level of suspended particle mass exposure (recommended for a single 24 hour period one day per year) by 15%. Smoking generally takes place on the units between the hours of 8 AM and 11 PM, a 15 hour period. The average concentrations of ETS which are inhaled during those hours are therefore 37% higher than those calculated for a 24 hour period. The mean concentration of suspended particle mass averaged over 15 waking hours is 236.90 ug/m^3. I t i s important to reiterate here that air contaminants in outdoor and indoor environments vary and have not been established to have similar biologic or physiologic properties. Therefore, caution must be used in interpreting the indoor sampling

Table 1. Sample Locations Before (A) and After (B) Smoking Ban (values are averaged over a 24 hour period).

Monitor Location	Nicotine ug	Nicotine ug/m^3	Suspended Particle Mass ug/m^3
1 A	0.63	2.61	31.25
2 A	0.32	1.32	15.88
3 A	1.04	4.30	51.59
4 A	3.98	16.45	197.42
5 A	2.79	11.53	138.40
6 A	3.67	15.17	182.05
7 A	1.47	6.08	72.91
8 A	2.22	9.18	110.12
1 B	0.03	0.12	1.44
2 B	0.01	0.04	0.46
3 B	0.05	0.21	2.52
4 B	0.04	0.17	2.04
5 B	0.06	0.25	3.00
6 B	0.05	0.21	2.52
7 B	0.06	0.25	3.00
8 B	0.05	0.21	2.52

results in comparison to outdoor E.P.A. standards. It has been established, however, that this concentration of ETS indoors is associated with acute tissue irritation and chronic respiratory damage.

The adult units, Unit I and Unit III, evidenced lower nicotine concentrations than Unit II. The proportions of self-reported smokers on Units I and III, 30% and 37%, respectively, were also lower than the proportion of self-reported smokers on Unit II, which was 55% (Table 2).

Table 2. Self-Reported Smokers Before (A) and After (B) Smoking Ban.

	Total Number of Smokers / Patients Admitted	Male:Female Smokers / Patients Admitted (A)	(B)
Unit I	8 / 22	3 : 2 / 17	2 : 1 / 5
Unit II	17 / 35	3 : 7 / 18	3 : 4 / 17
Unit III	12 / 36	4 : 2 / 16	5 : 1 / 20

This may account for the elevated nicotine concentrations on Unit II, although it is the number of cigarettes smoked (which was not recorded) rather than the number of smokers which is directly related to environmental nicotine concentration.

Following the ban, nicotine concentrations in the air dropped dramatically on all three units (Table 1). The values for environmental nicotine exposure and suspended particulate mass were uniformly low, and the difference between Units I & III and Unit II was no longer statistically significant. The air quality was measurably improved in the absence of ETS.

Monitoring Nicotine Exposure

A total of 93 patients were admitted to the psychiatric services during the 12-week study period (Table 3).

Table 3. Patient Admissions During the 12-Week Study Period, Before (A) and After (B) the Smoking Ban.

	Total	(A)	(B)
Unit I	22	17	5
Unit II	35	18	17
Unit III	36	16	20
	93	51	42

The units showed no significant difference with respect to patients' sex, race or number of previous psychiatric hospitalizations. Thirty-eight percent were married and 62% were single, including the predominantly unmarried adolescent population. Eighty-nine percent were white, 11% nonwhite. Fifty-seven percent had never been hospitalized psychiatrically before, and the remainder had had from one to

eight previous psychiatric hospitalizations. Sixty-seven percent were the only smokers in their home, while 33% lived with at least one other smoker. Neither marital status nor sex nor history of past psychiatric hospitalizations predicted smoking status [Fisher's Exact Test (2-tail)].

A total of 44 urine samples were collected (Table 4).

Table 4. Urine Samples Obtained Before (A) and After (B) Smoking Ban.

	Total	(A)	(B)
Unit I	17	10	6
Unit II	18	14	4
Unit III	9	9	1
	44	33	11

The specimens were refrigerated, aliquoted, frozen at -80 degrees Centigrade and shipped to Labstat, Incorporated in Ontario, Canada for analysis by gas chromatography. Nicotine, cotinine and creatinine levels were reported, and normalized levels were calculated (Table 5 and Table 6, pp. 57-58).

Active smokers had urinary nicotine and cotinine concentrations in the range of hundreds to thousands of ng/mL. Nonsmokers who had been in a nonsmoking area of their unit for several hours before the specimens were collected, i.e. had been in a patient bedroom overnight, had no measurable

nicotine levels. The difference in urinary markers of tobacco consumption between self-reported smokers and nonsmokers was significant and not unexpected ($p<0.0001$).

All nonsmokers, however, did show evidence of tobacco smoke exposure; every specimen collected before the smoking ban had measurable cotinine levels. Although air monitor results did show a statistically significant difference between Unit I & III and Unit II, urinary cotinine levels (controlling for smokers and nonsmokers) did not vary significantly among the units. It is noteworthy that the degree of passive smoke exposure as evidenced by urinary cotinine concentrations was not increased on Unit II even in the presence of higher levels of ETS. It is possible that, although urinary cotinine is specific for tobacco exposure and is indicative of dose, it may not be a sensitive measure of the degree of exposure in these ranges. It is also possible that nonsmokers on Unit II avoided the smoke-filled dayroom.

Following the ban, smokers continued to have measurable urinary nicotine and cotinine levels. Subject 6, for example, had submitted specimens during both urine collections and was a smoker. Since he was stable and preparing for discharge, he was permitted to leave the unit periodically during the day to smoke. He continued to show evidence of tobacco consumption, but his nicotine and cotinine levels were decreased. Subjects 22 and 37 were smokers unable to leave

Table 5. Results of Urine Sampling Before Smoking Ban.

Subject		Creatinine umol/L	Nicotine ng/ml	Cotinine ng/ml	Nicotine Creat.	Cotinine Creat.
Unit I						
01	NS*	2.15	0.4	9.3	0.19	4.33
02	NS	1.90	0.8	4.2	0.42	2.21
03	NS	0.42	0.0	1.7	0.0	4.04
04	S*	3.57	772.8	1265.4	216.48	354.47
05	NS	1.77	704.0	1405.8	509.47	792.27
06	S	0.77	468.3	1915.7	604.27	2471.92
07	S	0.52	75.4	1385.9	144.31	2652.43
08	NS	3.92	9.0	3.2	2.29	0.82
09	NS	0.41	0.0	2.9	0.0	7.13
10	S	0.49	211.0	1055.1	432.88	2164.60
Unit II						
11	NS	2.72	0.0	20.2	0.0	7.42
12	S	1.20	1461.1	2436.3	1221.87	2037.39
13	NS	2.16	4.2	9.0	1.94	4.16
14	NS	3.68	1.9	25.1	0.52	6.83
15	NS	2.32	10.4	23.9	4.47	10.28
16	NS	1.41	0.8	6.7	0.57	4.76
17	NS	2.49	0.0	7.5	0.0	3.01
18	NS	1.51	0.0	44.2	0.0	29.18
19	S	0.52	1562.4	1011.7	3030.92	1962.61
20	NS	3.10	220.4	1340.9	71.18	433.05
21	NS	1.30	4.6	2.6	3.62	2.05
22	S	0.95	594.4	1084.8	576.09	1137.51
23	NS	1.34	1.9	13.1	1.42	9.80
24	S	2.29	4.0	5.3	1.74	2.31
Unit III						
25	NS	1.20	2.2	3.9	1.83	3.25
26	NS	0.74	0.0	5.5	0.0	7.43
27	NS	0.36	0.8	1.8	2.13	4.80
28	NS	3.36	41.1	27.5	12.24	8.19
29	S	1.69	2029.1	2105.4	1203.19	1248.43
30	NS	5.04	0.0	39.2	0.0	7.78
31	NS	0.19	0.0	1.2	0.0	6.46
32	NS	0.72	1.9	11.2	2.66	15.66
33	NS	1.84	5.2	9.0	2.83	4.90

* S = Smoker, NS = Nonsmoker (Self-reported)

Table 6. Results of Urine Sampling After Smoking Ban

Subject	Creatinine umol/L	Nicotine ng/ml	Cotinine ng/ml	Nicotine Creat.	Cotinine Creat.
Unit I					
06 S* - R**	2.89	698.1	1261.6	241.93	437.22
07 S - R	0.63	0.0	0.9	0.0	1.43
34 NS*	1.05	0.0	0.0	0.0	0.0
35 NS	3.32	0.0	3.5	0.0	1.05
36 NS	0.30	0.0	0.0	0.0	0.0
37 S	0.98	0.0	49.8	0.0	50.72
Unit II					
15 NS - R	0.66	0.0	0.0	0.0	0.0
18 NS - R	2.07	0.0	0.0	0.0	0.0
19 NS - R	0.72	3.2	7.7	4.45	10.71
22 S - R	1.72	12.2	214.0	7.02	123.06
Unit III					
28 NS - R	0.74	0.0	1.6	0.0	2.15

* S = Smoker, NS = Nonsmoker (Self-reported)
** R = Repeat, second specimen submitted

the unit in order to smoke. Nicorette gum was offered as a substitute for smoking, and this is reflected in normalized urine nicotine and cotinine levels of 7.02 and 123.06 (Subject 22) and 0.0 and 50.72 (Subject 37). An analysis of variance was performed for the mean urinary cotinine levels among smokers and was found to have dropped significantly following the ban ($p<0.01$).

After the smoking policy went into effect, 4 of 7 of the nonsmoking patients who submitted urine specimens showed no evidence of involuntary exposure to tobacco smoke. The remainder of the nonsmoking patients may have been exposed to tobacco smoke outside of the hospital, but this information is not specifically known. Urinary cotinine levels of 0.0 for several nonsmokers after the ban strongly suggests an improvement in ETS, although the relatively low levels of cotinine in the majority of nonsmokers and the small number of samples obtained after the ban makes this statistical analysis difficult.

Monitoring Patient Acuity

A review of the doctor's order sheets and medication administration records of all 93 patients on the service during the 12-week study period yielded the following results (Tables 7a, 7b, 7c, pp. 61).

No overall difference in the total number of p.r.n. medications administered was found on any of the three units.

When p.r.n. medications were tabulated by drug class, only the administration of Nicorette gum increased significantly from 0 doses to 58 doses. Since Nicorette was offered specifically as a substitute for cigarettes after the ban, this finding is not at all surprising. Orders for restraints actually decreased, but not substantially.

Staff Questionnaires

Questionnaires were distributed to the 72 staff members 4 weeks prior to and 4 weeks following the change in smoking policy. The overall return rate was 82%. Two of the three senior psychiatrists, four of eight resident psychiatrists, five of six social workers, 32 of 41 nursing staff, and four of five clerical staff returned the questionnaires. All of the psychologists, neuropsychologists and supervisory nursing staff returned the questionnaires.

The mean age of the respondents was 35 years. The members of the staff represented a considerable number of years of experience in the field of mental health. Forty-two percent of the respondents had been working with psychiatric patients for greater than 10 years. Another 37.5% had been in the field between 3 and 10 years.

Exactly 50% of the staff had been smokers at some point in their lives, a proportion at least 10% greater than the

Table 7a. Total P.R.N. Administration During the 12-Week Study Period Before (A) and After (B) the Ban.

	(A)	(B)
Unit I	318	319
Unit II	157	199
Unit III	204	183
	679	701

Table 7b. P.R.N. Administration During the 12-Week Study Period Tabulated by Drug Classification.

	(A)	(B)
Antipsychotics	74	80
Anxiolytics	282	277
Sedative-Hypnotics	31	22
Nicorette Gum	0	58
Analgesics	174	162
Antacids	118	102
	679	701

Table 7c. Physician's Orders for Restraints During the 12-Week Study Period.

	(A)	(B)
Unit I	6	2
Unit II	17	11
Unit III	0	2
	23	15

national average. Currently, 23.2% were smokers and 76.8% were nonsmokers, indicating that more than half of those who had ever been smokers had quit. Only 16.1% had at least one smoker living at home with them.

The overwhelming majority of respondents indicated that a smokey environment bothered them. Forty-eight percent reported they were bothered frequently by smoke, 41.1% indicated they were bothered occasionally, 8.9% were bothered only seldom, and 1.8% reported never being disturbed by smoke.

Predictions as to whether or not the no smoking policy would be successful were recorded in a Likert-type scale and varied as follows: one staff person predicted the policy would be very unsuccessful; 20% predicted it would be unsuccessful; 14.5% were neutral; 60% predicted success; and, 5.5% predicted it would be very successful. No significant relationship was found between the position of the staff member or their number of years of experience in mental health and their prediction of success.

After the nonsmoking policy had been in effect for 4 weeks, the staff were asked again if they believed the policy was successful or unsuccessful. Nearly 94% of the respondents rated the new policy a success, and 98% believed the patients were accepting of the policy. The fact that a staff member was a smoker or nonsmoker had no bearing on whether or not he or she expected the smoke-free policy to succeed or fail, or whether he or she viewed its outcome as a success or failure

[Fisher's Exact Test (2-tail)]. Only 80% of the respondents in the follow-up questionnaire indicated their desire to maintain a nonsmoking policy, despite significant agreement that it had been a success and that the patients had accepted the change well. In this case, smoking status was the one variable which did influence the desire to change the policy back to allow for smoking [Fisher's Exact Test (2-tail), $p<0.004$).

Among staff members who currently were smokers, 25% reported that they had not changed their smoking habits, while 75% reported that they had. One of nine reported having stopped smoking, and three of nine considered quitting. Four of nine reported a decreased in cigarette smoking, and only one of nine reported an increase in cigarette consumption outside work. Four of nine indicated that they needed to leave the hospital periodically during work hours in order to smoke.

The attitudes of the staff members toward smoking and smoking policies were assessed using a 5-point scale. Items were grouped for purposes of analysis into those statements which indicated support for a smoke-free policy (Appendix A: Items B, E, J), those which opposed such a policy (Items C, D, G, H, I) and those which were neutral (Items A, F, K, L). Responses were then given values as follows:

+2 for "strongly agree" with B, E, J
+1 for "agree" with B, E, J
0 for a neutral response to any item
-1 for "agree" with C, D, G, H, I
-2 for "strongly agree" with C, D, G, H, I

This rating system assigned a value to how much each respondent supported the principles of a nonsmoking policy (resulting in a positive value) or did not (resulting in a negative value). If a respondent had conflicting opinions, e.g. agreed that hospitals should be smoke-free and also agreed that smoking may be one of the few remaining pleasures of psychiatric patients, this would be reflected as a neutral position. The distribution of the values was expected to be slightly negative since more items were assigned a negative value. The frequency plots resulted in a normal distribution which allowed the mean scores to be used in an analysis of comparisons between attitudes and other variables. The mean scores were collapsed into three approximately equal groups: 1) mean scores of +1 to +7 (27.3%) were considered "in favor" of the nonsmoking policy; 2) mean scores of 0 to -4 (38.2%) were considered "neutral"; 3) mean scores of -4 to -13 (34.5%) were considered "opposed to" the nonsmoking policy.

The mean scores were analyzed in relation to a number of other variables. There was no statistically significant relationship found between attitude scores and: 1) smoking status; 2) position; 3) number of years of experience; 4) prediction of success; 5) later judgement of the policy as a success or failure; 6) later preference to return to a smoking policy.

All the tables and graphs which could be compiled to describe the staff's attitudes toward the nonsmoking policy

do not begin to convey the degree of affect attached to this issue. To convey that, I will let the staff members speak for themselves. The quotes which follow were taken from the questionnaires completed before the ban went into effect. The first four are representative of the position of those staff members in support of the policy change.

"There's a feeling of uncleanness that accompanies smoking, the taste in one's mouth, the subtle but plaintive silent whine for more nicotine one half hour after a cigarette...It seems to me that at a time when a person is working on finding a sense of healthy self, of bio-psycho-social 'wellness,' cigarette smoking (especially excessively, with hours to kill between meetings) lends a secret sense of failure & fatigue."

"During my years working on this unit, I have found it surprising that patients who are chain-smokers, when put in a position where they are not allowed to smoke (restraints, room restriction), usually can stop smoking with little difficulty, and will often go weeks without smoking."

"Nonsmokers have their rights violated now. Smoking is a privilege, not a right."

"Smoking may favorably impact on a patient's ability to communicate with staff only to the degree that it is one of many social behaviors used to facilitate conversation (drinking is another). It is part of our job to teach more healthful ways of interacting and to replace smoking with other learned behaviors which are socially appropriate and facilitative."

Other comments indicated ambivalence about the new policy and some reservations about the appropriateness of this "experiment."

"I have mixed feelings about insisting that psychiatric patients stop smoking in the hospital. I have been put off by the self-righteous stance of the nonsmoking staff."

"I am a nonsmoker so I can't really empathize with how difficult it may be for some people to stop smoking precipitously. I am not optimistic about the success of the nonsmoking policy, but I will support it enthusiastically."

"I do not think it will be difficult for many; I think it will be difficult for a few and that is the central issue."

"Although I realize that smoking is a significant avoidable health problem, I have come to realize, sadly, the importance of cigarettes and coffee to our chronic psychiatric patients. For many its one of life's few remaining pleasures."

Finally, there were some staff who were clearly opposed to introducing a nonsmoking policy.

"... To add 'no smoking' to an already stressful situation is ridiculous. Better to provide education and encouragement rather than absolute rules."

"This is not a detox unit!"

"Is it legal for us to tell involuntary patients they can't smoke? I don't think so!"

"Nice idea - personally I like it - but I don't think it's practical for psychiatric patients."

The follow-up questionnaires completed four weeks following the ban indicated overwhelming support in favor of the policy.

"The advantages to the health of patients and all others in the environment far outweigh the difficulties."

"It is wonderful!"

"It provides health care in a holistic fashion."

"I'm shocked we haven't had more impulsive outbursts when people are told they can't smoke."

"The ban stifles 'freedom of choice' but it is a positive community role model and it's safer."

"It's an incentive to get well and go home!"

"It's nice to work in a smoke-free environment."

Several staff members continued to express reservations about the ban.

"I don't like this controlling and patriarchial position toward patients."

"I think it poses problems for the acute management of individual patients. One patient was set back a week in his treatment."

"I think there should be a time and place where you could go and have a cigarette if you so desire."

"It feels strange to be unable to use cigarettes as rewards."

Some staff members raised important, pragmatic concerns about the new policy which only became clear once the policy went into effect.

"The smoking congregation at the front door is distasteful."

"I think we may need smoke alarms in the bathrooms."

"It clouds the issues. I cannot differentiate between the signs and symptoms of nicotine withdrawal and an increase in psychotic symptoms."

"Employees are smoking in the building. There is less coverage during off shifts, because staff leave units to smoke. Smokers are resistant to helping out by working off shifts knowing they aren't supposed to smoke."

The members of the staff touched upon many salient issues. Opinions about health, fairness, stress, pleasure, safety and legality were aired, and the concerns expressed seem clearly grounded in a desire to do what is believed to be best for the patients.

DISCUSSION

The major findings of this study are that psychiatric patients are able to be treated successfully and safely in a smoke-free setting and that introducing a nonsmoking policy leads to a measurable improvement in air quality and a decrease in environmental tobacco smoke exposure. The positive changes in the environment have implications for everyone who works, visits or receives treatment in a smoke-free setting.

The question of whether or not patients should be permitted to smoke while receiving care in a psychiatric facility must be evaluated in the current social context of an increased awareness of the health hazards associated with smoking and the movement toward legislated restrictions on smoking. Increasing numbers of general hospitals are adopting smoke-free policies. The fact that, by and large, psychiatric hospitals and psychiatric wards in general hospitals have been synonymous with cigarette smoking for decades contributes to the reluctance to restrict or ban smoking in these facilities.

Many psychiatric patients are heavy smokers. The statistics reveal that the proportion of cigarette smokers in the psychiatric patient population is 52 to 88%, 19 to 55% higher than in the general population. The myth that psychiatric patients enjoy some measure of protection against smoking-related diseases has been described in the literature since the early 1900's. To what degree this influences

current decision-making about smoking policy is unclear. What is clear is that many psychiatric professionals believe that, for many patients, smoking is an integral part of being mentally ill.

Cigarette smoking presents some dangers unique to psychiatric patients. Smoking decreases serum levels of the commonly prescribed antipsychotic drugs. This may require an increase in the dose necessary to achieve a therapeutic effect. Consequently, psychiatric patients who smoke and who are receiving neuroleptics may need higher doses of drugs over long periods and thus may be placing themselves at a higher risk of developing tardive dyskinesia.

The conclusions of other investigators interested in the effects of introducing a nonsmoking policy on a psychiatric service have been supported in this study. It is possible to offer treatment in a healthier, less polluted environment to patients in need of psychiatric care.

The improvement in air quality was clearly demonstrated using passive nicotine monitors. The contaminants associated with ETS, as measured by vapor phase nicotine concentrations, dropped to barely perceptible levels after the ban. The average recorded level on the adolescent unit had been high enough, 236.90 ug/m^3, to be considered hazardous by E.P.A. outdoor air standards. Although the precise health consequences of exposure to these levels of suspended particle mass associated with ETS have not yet been established, it is

clear from the efforts of researchers in the field of involuntary smoking that exposure to second-hand smoke is dangerous, and that the higher the levels, the greater the danger.

ETS exposure was quantified by measuring the concentrations of nicotine and cotinine, a metabolite of nicotine, in the urine of patients before and after the smoking ban. Active smokers evidenced predictably high levels of ETS exposure. Nonsmokers also demonstrated evidence of ETS exposure, but to a lesser extent. The danger of ETS exposure has been substantiated. What has not yet been determined are the levels at which exposure to ETS, as measured by concentrations of nicotine and cotinine in the bodily fluids, becomes hazardous. The important finding here is that all patients, smokers and nonsmokers alike, showed evidence of exposure to ETS before the ban, and that 50% of all nonsmoking patients whose urine was analyzed after the ban showed no evidence of ETS exposure. This data strongly suggests that a nonsmoking policy does reduce environmental contaminants and pollutants, effectively safeguarding the safety and comfort of nonsmokers.

The months and weeks preceding the adoption of the nonsmoking policy were characterized by considerable trepidation and skepticism. Many staff members, nearly 35%, felt sure that the new policy would be impossible to enforce. While on an inpatient psychiatric unit patients are expected

to refrain from drinking alcohol, taking nonprescribed or illegal drugs, using impolite language, striking or threatening one another, running through the halls, or having physical contact. All these rules seem reasonable, yet many believed that enforcing a ban on smoking would be extraordinarily difficult.

Two of the senior psychiatrists felt strongly that the policy change could be potentially detrimental to their patients. Their concern was so great that they entertained the possibility of not changing the smoking policy, despite the administration's expectations. These two senior psychiatrists treated many smokers during a period in which the encouragement of cigarette smoking cessation among psychiatric patients was not expected. Their strong associations between cigarette smoking and psychiatric care were challenged by the adoption of a non-smoking policy.

For many, the smooth transition to a smoke-free environment was a surprise. The patient acuity levels, measured as the need for p.r.n. medications and restraints, did not undergo a significant change once patients were no longer allowed to smoke. The increase in patient management difficulties expected by some staff did not materialize.

Four weeks after the ban went into effect, the follow-up questionnaires polled the impressions and opinions of the staff. Although it was now clear that a non-smoking policy was possible to implement, the staff continued to express

mixed opinions about the new policy. It was determined that the smokers in the group were the individuals who continued to feel that a policy which has some provisions for smoking would be preferable.

The opinions and reports of the staff obtained after the ban raise several critical issues to which administrators must remain alert when a non-smoking policy is implemented in a psychiatric facility. First, staffing patterns must be designed to continue to insure the safety of patients and staff at all times. This means that, even at night, staff members wishing to smoke must either refrain from smoking or obtain adequate coverage during a smoking break. Staff members cannot be made to feel that their best or only option is to leave a patient care area inadequately covered in order for them to smoke.

The short term follow-up in this setting indicates that smokers, once smoking is no longer permitted in the workplace, may be more likely to quit smoking, to consider the possibility of quitting smoking, or to reduce their daily cigarette consumption. Perhaps the inconvenience of not being able to smoke, peer pressure, daily successes with longer and longer periods of abstinence from cigarettes or some combination of these factors or others contributed to this trend. Whatever the motivation, it seems that the inability to smoke at work impacts on the smoking habits of employees. Although smoking cessation programs did become available at

Yale-New Haven Hospital, it was not ascertained whether or not any staff members utilized these programs in their efforts to quit smoking. If the staff members who continued to smoke after the ban wish to stop smoking, smoking cessation programs should be made readily available, accessible and affordable (if not free).

A particular problem in this setting raises a third critical point and stems from the layout of the physical plant. The psychiatric service is located on the 10th and uppermost floor of the medical center. The windows are sealed shut and, although ventilation is generally adequate, thick smoke cannot escape. There is no porch or terrace, no enclosed area where the patients who are unable to travel safely on the elevator and through the hospital lobby to the outdoors can smoke. Because of these limitations, only patients who are stable are able to get outside at all. In many facilities, an outdoor area, often enclosed, is available for patients to exercise or to get fresh air. If psychiatric hospitals and general hospitals with psychiatric units begin to consider the possibility of instituting smoking bans seriously, the availability of a safe and accessible outdoor area would become an increasingly important issue.

For the adolescent patients, the impact of a no smoking policy is even greater than for the adult patients. Certainly, the improvement in the air quality of the unit and the decrease in involuntary smoking represents a positive

change. More important, however, is the message inherent in banning smoking. It is a means of upholding the law; it is illegal for those under 18 to purchase or to smoke cigarettes in the state of Connecticut. It represents a direct and unyielding message that dangerous behaviors will not be tolerated, encouraged or condoned, and that physical health, as well as mental health, is important. Permitting smoking conveys a message that the health of psychiatric patients is not important enough to warrant concern or intervention. Teaching good health practices is part of the responsibility of health professionals in any field. Engaging young people in an effort to raise the standards of good health practices has been proven to be effective. Permitting cigarette smoking, particularly rewarding good behavior with cigarettes, is diametrically opposed to this goal.

During the first urine collection, several adolescent patients reported that the numbers of cigarettes they smoked in a week had increased dramatically since coming into the hospital. Many stated that they were not permitted to smoke at home but felt no constraints on smoking in the hospital. Yet, of the 17 self-reported smokers in the adolescent group, 55% of the patients, only 4 submitted urine specimens for analysis. Perhaps a fear of being punished for smoking played a role in the reluctance of the smokers to participate fully. Or, perhaps the ambivalence of the unit leadership, as evidenced by the unwillingness of the Unit Chief to actively

support this study, contributed to the limited participation of the smokers. A number of adolescent patients did remark during the second urine collection that they were pleased to no longer be pressured to smoke by their peers.

A point which has been discussed by other authors (50, 57) bears repeating. Medication follow-up becomes critically important for patients who have been stabilized on neuroleptics in a smoke-free environment. The decrease in plasma concentrations of these drugs, once tobacco consumption has resumed, may require an increase in drug dosage. Clinicians who treat these patients outside of the hospital must remain cognizant of this possibility.

This study has several important limitations. It is difficult to construct a convincing argument that what is possible on a general hospital psychiatric service would necessarily be feasible on a state hospital ward or Veteran's Administration ward for chronic patients. The goals of this policy were to eliminate smoking during hospitalization, to offer a cleaner environment for nonsmokers and to set an example of good health practices. Are the same goals attainable for patients who are hospitalized for many months or years? Further study in such settings is necessary to answer that question. Similarly, would the elimination of smoking on a substance abuse or chemical dependence unit present any unforeseen difficulties? Only additional trials in those settings could demonstrate them. Could the

implementation of non-smoking policies reduce the prevalence of smoking among the psychiatric staff members? It would be useful to study the impact of these policy changes on the smoking behaviors of staff members over time. This study has illustrated the fact that a smoke-free psychiatric service is possible and, at least in these settings, the fantasy of what could happen was far worse than the reality.

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APPENDIX

STAFF QUESTIONNAIRE

1. SEX (please circle) F M

2. AGE _____

3. STAFF POSITION

_____Senior Psychiatrist
_____Resident Psychiatrist
_____Psychologist
_____Neuropsychologist
_____Head Nurse/Nurse Specialist
_____Social Worker
_____Staff Nurse
_____Mental Health Worker
_____Clerical Worker

4. NUMBER OF YEARS IN THIS POSITION

_____<1 _____1-3 _____3-5 _____5-10 _____>10

5. NUMBER OF YEARS IN MENTAL HEALTH

_____<1 _____1-3 _____3-5 _____5-10 _____>10

6. TYPES OF MENTAL HEALTH FACILITIES IN WHICH YOU HAVE WORKED AND FOR HOW MANY YEARS

Acute Inpatient (Adult)	___<1	___1-5	___6-10	___>10
Chronic Inpatient (Adult)	___<1	___1-5	___6-10	___>10
Research Inpatient	___<1	___1-5	___6-10	___>10
Veteran's Administration	___<1	___1-5	___6-10	___>10
Adolescent Inpatient	___<1	___1-5	___6-10	___>10
Children's Inpatient	___<1	___1-5	___6-10	___>10
Psychiatric Day Hospital	___<1	___1-5	___6-10	___>10
Psychiatric Outpatient	___<1	___1-5	___6-10	___>10
Other_____	___<1	___1-5	___6-10	___>10

7. SMOKING POLICIES IN THE FACILITIES IN WHICH YOU HAVE WORKED (CHECK ALL WHICH APPLY)

_____Liberal - smoking permitted in most areas at most times
_____Designated smoking/non-smoking areas
_____Designated smoking/non-smoking times
_____Restricted - smoking generally not permitted
_____No smoking permitted

8. Have you ever been a smoker? _____Yes _____No

9. Do you smoke now? _____Yes _____No

10. If you smoke now, for how many years have you smoked and how many packs per day do you smoke on average?

Years _____<1 _____1-5 _____6-10 _____11-20 _____>20
Packs/Day_____<1 _____1-2 _____2-3 _____>3

Not applicable _____

11. If you were a smoker and have quit, for how many years have you been a non-smoker?

_____<1 _____1-5 _____6-10 _____11-20 _____>20

Not applicable _____

12. Does anyone (besides yourself) smoke cigarettes in the home in which you now live?

_____Yes _____No

13. Does smoke in the environment bother you? How often?

____Frequently ____Occasionally ____Seldom ____Never

If smoke bothers you, in what ways does it bother you?

_____Clothes and hair smell
_____Eye irritation
_____Headaches
_____Coughing/throat irritation
_____Health concerns
_____Others (please specify)

_____

_____

Strongly Disagree Disagree Neutral Agree Strongly Agree
_____1_____2_____3_____4_____5_____

Please place the number next to each statement which best describes your opinion. For example, if you agree with a statement, but do not feel very strongly about it, place the number "4" next to the statement.

_____ I believe psychiatric patients smoke excessively.

_____ I believe psychiatric professionals have a responsibility to teach their patients good health practices.

_____ I believe the decision to smoke is an individual one that should not be decided by hospital policy.

_____ I believe that cigarette's provide useful leverage in shaping patients' behavior when used in a behavior modification program.

_____ I believe that hospitals should be smoke-free.

_____ I believe that having designated smoking and non-smoking areas provides the most reasonable compromise for a smoking policy.

_____ I believe that smoking may favorably impact on a patient's ability to communicate with staff members.

_____ I believe that smoking may be one of the few remaining pleasurable activities for many psychiatric patients.

_____ I believe that a non-smoking policy will be excessively anxiety-producing for many psychiatric patients.

_____ I believe that most psychiatric patients will be able to cope with a non-smoking policy without excessive acting-out.

_____ I believe that smoking a significant health problem for many psychiatric patients.

_____ I believe that the hospital should provide smoking cessation programs for staff and patients if smoking is not permitted.

Please rank on a scale of 1 - 5 what you expect the level of success of the non-smoking policy will be (circle one):

very unsuccessful	unsuccessful	neutral	successful	very successful
1	2	3	4	5

Please use this space to add any comments you may have about smoking or smoking policies. I thank you for your time and participation.

SMOKING POLICY STUDY
FOLLOW-UP STAFF QUESTIONNAIRE

1. SEX (please circle) F M

2. STAFF POSITION

_____Senior Psychiatrist
_____Resident Psychiatrist
_____Psychologist
_____Neuropsychologist
_____Head Nurse/Nurse Specialist
_____Social Worker
_____Staff Nurse
_____Mental Health Worker
_____Clerical Worker

3. NUMBER OF YEARS IN THIS POSITION

_____<1 _____1-3 _____3-5 _____5-10 _____>10

4. NUMBER OF YEARS IN MENTAL HEALTH

_____<1 _____1-3 _____3-5 _____5-10 _____>10

5. Have you ever been a smoker? _____Yes _____No

6. Do you smoke now? _____Yes _____No

7. If you are a smoker, has the change in smoking policy changed your smoking habits?

_____Yes _____No

In what way(s)?

_____stopped smoking
_____considered stopping smoking
_____reduced cigarette consumption
_____increased cigarette consumption outside work
_____increased need to leave hospital during work hours in order to smoke
_____other
Please explain

8. If you are a smoker, has the nonsmoking policy been a problem for you in any way other than changing your smoking habits?

_____Yes _____No

In what was(s)? Please describe:

9. Is it your impression that the patients on your unit are, in general,

_____accepting of the nonsmoking policy

_____not accepting of the nonsmoking policy

10. What do you think are the psychiatric, patient care, or management pros and cons associated with the nonsmoking policy? Please describe:

11. Do you consider the policy as it now stands

_____successful _____unsuccessful

12. Would you like the policy to remain in effect as it stands?

_____Yes _____No

13. What specific changes would you like to see made in the policy?

Please add any other comments you may have on the back of this sheet. I thank you very much for your contribution to this research.

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